

## REMARKS

Claims 1-4, 6-9, 19, 21-27, 29, 32, 34-40, 42-46, 48-52 and 56-60 were examined and rejected. Applicant neither amends nor cancels any claims. Applicant respectfully request reconsideration of claims 1-4, 6-9, 19, 21-27, 29, 32, 34-40, 42-46, 48-52 and 56-60 in view of at least the following remarks.

### I. Claim Rejections Under 35 U.S.C §102

The Patent Office rejects claims 1-2, 43-44, 56 and 60 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0048868 to Bailey, et al. (Bailey). It is axiomatic that to be anticipated every limitation of a claim must disclosed in a single reference.

Applicant respectfully disagrees with the rejection above and submits that independent claim 1 is patentable over the cited reference for at least the reason that the cited reference does not disclose "adjusting automatically the treatment plan based on movement in the fluoroscopy data image" as required by claim 1.

Bailey discloses positioning patient 62 on table 60, comparing CT scanner slices of the patient with images taken during the planning stage (e.g., of an original plan), and moving the table to insure that the target region of the patient is within the region of interest (e.g., of an original plan) so that it can be exposed to the radiotherapy beam 50 (see paragraphs 48-49). Bailey also discloses adjusting the size and shape of the radiotherapy beam, adjusting the table position, and adjusting the angular position of radiation source 40 (according to the original plan), automatically, with some or complete control by the therapist, by using a computerized system including computer 80 (see paragraphs 51-53). Moreover, Bailey discloses a suitable collimator subsystem at 46 so that the cross-sectional shape and size of the radiotherapy beam can be modified (see paragraph 41).

Thus, although Bailey teaches a system that can create images using CT reconstruction techniques, as well as stationary and scout views (see Bailey paragraphs 37-40), the Patent Office has not identified and Applicant is unable to find any disclosure in Bailey of a fluoroscopy data image of a target volume (e.g., such as a real time or "live" video image, that, for example, may be used in a medical surgery procedure). In addition, the Patent Office has not identified and Applicant is unable to find any disclosure in Bailey that accounts for adjusting a treatment plan based on movement in a fluoroscopy data image, or adjusting automatically a treatment plan. Specifically, the sections cited above disclose adjusting a patient position or radiotherapy beam so that the beam is appropriately aligned with a target region according to a plan. However, the cited sections do not disclose adjusting a treatment plan, or adjusting automatically a treatment plan, as required by claim 1.

According to claim 1, for example, an original plan may be updated, such as by planning software recalculating a treatment dose, when the target position of the patient moves or changes, and is thus no longer in accordance with the original plan (see Applicant's specification paragraph 23 lines 18-35). In some cases, a care provider may determine that radiation fields are not correct or that a setup required by an original plan is mechanically unachievable (see paragraph 38), and thus may cause the original plan to be automatically adjusted by the planning software and system 100 based on adjustments made to the original treatment plan by the care provider (see paragraph 40). Also, the care provider may adjust static or MLC field position, size, and machine parameters by modifying an image at a workstation, the result of which will be the planning software automatically adjusting system 100 according to the updated plan, such as by moving to new positions, the simulation machine, couch, treatment margins or respiratory gating (see paragraphs 40-41).

Now addressing the **Response to Arguments** section of the current Office Action (item 24). Bailey describes moving a patient to the appropriate location according to a single, non updated plan. Specifically, paragraph 48 describes scanning a patient on a treatment machine to determine the location of the patient according to the desired location of the patient according to a planning stage. Paragraph 49 describes

determining the size and location of the target region of the patient on the treatment machine and moving the patient to ensure that the target region is within the region of interest according to the plan, to ensure that the therapy radiation beam is shaped sized and properly aligned with the target region prior to exposure according to the original plan. Thus, although Bailey describes moving a patient to ensure that a target region is within a region of interest according to an original plan, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Bailey that the original plan (e.g., the region of interest, therapy radiation beam shape, size, and alignment with the target region of the original plan) is ever changed.

Next in the **Response to Arguments** section of the current Office Action the Patent Office asserts that Frohlich also discloses or suggests automatically adjusting a treatment plan as required by claim 1. Applicant respectfully disagrees. Similar to Bailey, Frohlich describes improving patient positioning so that an x-ray image of the patient's body part produced in a linear accelerator may be compared to a reference radiograph, previously obtained at the simulator to ensure accurate positioning according to a radiotherapy or radiosurgery plan (see column 1 lines 14-34; column 2 lines 8-18). However, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Frohlich of automatically adjusting an existing treatment plan, based on movement in a fluoroscopy data image, as required by claim 1.

Hence, for at least the reason that the cited reference does not disclose the limitations of claim 1 noted above, Applicants respectfully request the Patent Office withdraw the rejection above.

Applicant respectfully disagrees with the rejection above and submits that independent claim 43 is patentable over the cited references for at least the reason that Bailey does not disclose "adjusting automatically the treatment plan based on movement in the fluoroscopy data image," as required by claim 43. Arguments analogous to the ones above with respect to claim 1, apply here as well. Hence, Applicant respectfully requests the Patent Office withdraw the rejection above of claim 43, for at least the reasons cited above with respect to claim 1.

Applicant respectfully disagrees with the rejection above and submits that independent claim 56 is patentable over the cited references for at least the reason that Bailey does not disclose a system that comprises a simulation component "wherein said radiation source is at a fixed position relative to the gantry," as required by amended claim 56. As described in the present specification, at paragraphs 56 and 57, for example, prior art simulation systems required a source that could move in relation to the gantry. Bailey does not teach or suggest a system with a simulation component wherein the radiation source is at a fixed position relative to the gantry. Hence, Applicant respectfully requests that the Patent Office withdraw the rejection above.

Applicant respectfully disagrees with the rejection above and submits that independent claim 60 is patentable over the cited references for at least the reason that Bailey does not disclose a distance from the radiation source to the axis of rotation is fixed, as required by claim 60. As described in the present specification, at paragraphs 56 and 57, for example, prior art simulation systems require a source that could be moved to change the distance between the source and the axis of rotation of the gantry. Bailey does not teach or suggest a simulation system with a simulation component wherein the radiation source is at a fixed distance relative to the axis of rotation relative to the axis of rotation of the gantry. Hence, Applicant respectfully requests the Patent Office withdraw the rejection above.

The Patent Office rejects claims 25, 29, 38 and 42 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,661,870 to Kapatoes, et al. (Kapatoes).

Also, Applicant respectfully disagrees with the rejection above and submits that independent claim 25 is patentable over the cited references for at least the reason that Kapatoes does not disclose "recalculating a treatment plan based on the input associated with the digital image, and saving the recalculated treatment plan," as required by claim 25. According to claim 25, for example, as noted at paragraphs 23, 38 and 41 of the Applicant's specification, a treatment plan may be automatically adjusted, recalculated and saved due to a change in target position, target movement, if radiation fields are not correct, if a setup cannot be mechanically adjusted, and/or due to respiratory motion.

On the other hand, Kapatoes teaches creating a new dose distribution, when therapy is to begin, if there has been a deformation or change in size of a tumor (see column 3 lines 43-57; column 5 line 41 through column 6 line 8). Specifically, Kapatoes teaches oncologist strategic "on the fly" adjustment (e.g., by considering tradeoffs), during treatment, of the dose threshold for any number of regions of interest and /or voxels (see column 6 lines 10-30; column 4 lines 3-6). For instance, Kapatoes distinguishes their new dose from a "dose that would be prescribed had the physician fully re-optimized the treatment plan..." (see column 6 lines 40-50). In fact, this teaching appears to be a teaching away from recalculating a treatment plan based on the input associated with the digital image, and saving the recalculated treatment plan, as required by claim 25.

Consequently, the Patent Office has not identified and Applicant is unable to find any disclosure in Kapatoes that the original treatment plan is actually recalculated (e.g., such as according to an adjustment of target position, target movement, incorrect fields, setups that cannot be mechanically achieved, and/or respiratory motion, as noted for a plan according to Applicant's specification). In addition, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Kapatoes of saving or storing a recalculated treatment plan, as required by claim 25. Hence for at least the reasons above, Applicant respectfully requests the Patent Office withdraw the rejection above.

Next, Applicant respectfully disagrees with the rejection above and submits that independent claim 38 is patentable over the cited references for at least the reason that Kapatoes does not disclose "recalculating a treatment plan based on the input associated with the digital image and saving the recalculated treatment plan" as required by claim 38. An argument analogous to the one above with respect to claim 25 applies here as well. Hence, for at least the reasons given above with respect to claim 25, Applicant respectfully requests that the Patent Office withdraw the rejection above of claim 38.

The Patent Office rejects claim 57 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,301,325 to Besson et al. (Besson).

Applicant respectfully disagrees with the rejection above and submits that independent claim 57 is patentable over the cited references for at least the reason that Besson does not disclose means to move the patient support as the gantry rotates to maintain a constant distance between the radiation source and a point defined in relation to the patient support, as required by claim 57. As described in the present specification, at paragraphs 56 and 57, software may automatically move the treatment couch closer to the gantry head and, as the gantry head is rotated around the patient, the couch may be continuously and automatically repositioned to maintain this treatment distance. For example at paragraph 57, the present invention allows for maintaining a constant distance between the source, and e.g. a target, during rotation, with the capability to provide treatment simulation for machines having different source to isocenter distances.

On the other hand, Besson teaches that table 46 is moved along a translation axis 48 aligned with the Z-axis of the Cartesian Coordinate System (see column 5 lines 14-16), but does not teach moving the table as the gantry rotates to maintain a constant distance between the radiation source and a point defined in relation to the patient support. Hence, for at least this reason, Applicant respectfully requests that the Patent Office withdraw the rejection above of claim 57.

Any dependent claims not mentioned above are submitted as not being anticipated or obvious, for at least the same reasons given above in support of their base claims.

## II. Claim Rejections Under 35 U.S.C §103

The Patent Office rejects claims 3 and 45 under 35 U.S.C. §103(a) as being unpatentable over Bailey, as applied to claims 1 and 43 above, and further in view of U.S. Patent No. 5,764,723 to Weinberger, et al. (Weinberger). To render a claim obvious, all limitations of that claim must be taught or suggested by at least one properly combined reference.

Applicant submits that dependent claims 3 and 45 being dependent upon allowable base claims 1 and 43 are patentable over the cited references for at least the

reasons stated above. Thus, Applicant respectfully requests that the Patent Office withdraw the rejection above.

The Patent Office rejects claims 4 and 46 under 35 U.S.C. § 103(a) as being unpatentable over Kapatoes in view of Bailey. Applicant respectfully disagrees with the rejection above and submits that independent claim 4 is patentable over cited reference for at least the reasons that the references do not teach or suggest "a third component to adjust the treatment plan based on the simulated execution of the treatment plan," as required by claim 4.

As noted above, Bailey teaches adjusting a patient's position and adjusting a radiotherapy beam to align the beam with a target region of the patient according to an original plan. Also, Kapatoes teaches changing a treatment dose when the therapy is to begin.

However, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Bailey of a third component to adjust a treatment plan, or of adjusting a treatment plan based on a simulated execution of the treatment plan, as required by amended claim 4. Specifically, as noted above for claim 1, Bailey does not teach or suggest adjusting a treatment plan, but instead discloses adjusting patient position according to a treatment plan. Also, Bailey does not teach or suggest adjusting a treatment plan based on a simulated execution of the treatment plan. Also, Kapatoes teaches changing a treatment dose when the therapy is to begin, but does not teach adjusting a plan, or adjustment of a plan based on a simulated execution of a treatment plan. Hence, for at least these reasons, Applicant respectfully requests the Patent Office withdraw the rejection above of claim 4.

Applicant respectfully disagrees with the rejection above and submits that independent claim 46 is patentable over the cited references for at least the reason that neither Bailey nor Kapatoes teach or suggest "a means for adjusting the treatment plan based on the simulated execution of the treatment plan," as required by amended claim 46. An argument analogous to the one above with respect to amended claim 4, applies here as well. Hence, for at least the reasons above with respect to claim 4, Applicant respectfully requests that the Patent Office withdraw the rejection above of claim 46.

The Patent Office rejects claims 6, 8, 48 and 50 under 35 U.S.C. § 103(a) as being unpatentable over Kapatoes and Bailey as applied to claims 4 and 46 above, and further in view of U.S. Patent No. 5,901,199 to Murphy et al. (Murphy).

Applicant submits that dependent claims 6, 8, 48 and 50 being dependent upon allowable base claims are patentable for at least the reasons described with respect to their base claims. Thus, Applicant respectfully requests the Patent Office withdraw the rejection above.

The Patent Office rejects claim 7 and 49 under 35 U.S.C. §103(a) as being unpatentable over Bailey and Murphy as applied to claims 6 and 48 above, and further in view of U.S. Patent Application Publication 2003/0007601 to Jaffray, et al. (Jaffray).

Applicant submits that dependent claims 7 and 49 being dependent upon allowable base claims 4 and 46 are patentable over the cited references for at least the reasons stated above. Thus, Applicant respectfully request that the Patent Office withdraw the rejection above.

The Patent Office rejects claims 9 and 51 under 35 U.S.C. §103(a) as being unpatentable over Bailey and Murphy, as applied to claims 6 and 48 above, and further in view of Frohlich.

Applicant submits that claims 9 and 51 being dependent upon allowable base claims 4 and 46 are patentable over the cited references for at least the reasons explained above. Thus, Applicant respectfully requests that the Patent Office withdraw the rejection above.

The Patent Office rejects claims 19, 21-24, 32 and 34-37 under 35 U.S.C. § 103(a) as being unpatentable over Frohlich in view of U.S. Patent No. 3,466,439 to Setala (Setala).

Applicant respectfully disagrees with the rejection above and submits that independent claim 19 is patentable over the cited references for at least the reason that Frohlich does not disclose automatically adjusting one of a radiation source and an imager of a radiotherapy simulator system, based on input associated with a digital image, as required by claim 19. According to claim 19, for example, as noted in paragraph 40 of Applicant's specification, a radiation source and an imager of a radiotherapy simulator system may be automatically adjusted (e.g., moved in position)



based on input from a care provider, such as by modifying field wires, collimator rotation, and couch position.

On the other hand, as noted above with respect to claim 1, Frohlich teaches locating a patient in accordance with a treatment plan. Specifically, Frohlich teaches superimposing a reconstructed image and an x-ray image, detecting positional errors, and correcting the location of a patient on the basis of the detected positional errors (see column 2). Frohlich also discloses moving the patient table, in particular automatically operated and corrected by a computer controlled and camera controlled navigation and tracking system with markers on the patient and/or on the patient table ( see column 3, lines 35-43).

However, the Patent Office has not identified and Applicant is unable to find any disclosure in Frohlich of automatically adjusting a radiation source or automatically adjusting an imager of a radiotherapy simulator system, based on input associated with a digital image, as required by claim 19.

Setala teaches a table and associated apparatus which may be adjusted through 360 degrees around the table in a vertical plane in which may be further adjusted longitudinally of the table (see Fig.2 and column 2 lines 16-20). However, Setala fails to cure the shortcomings of Frohlich. Specifically, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Setala of automatically adjusting one or more of a radiation source and an imager based on the input associated with a digital image, as required by claim 19. Hence, since none of Frohlich, Setala, or their combination teach or suggest the above noted limitation, Applicant respectfully requests the Patent Office withdraw the rejection above.

In addition, Applicant respectfully disagrees with the rejection above and submits that independent claim 32 is patentable over the cited references for at least the reason that the references do not teach or suggest automatically adjusting one of a radiation source and an imager of a radiotherapy simulator system based upon an input associated with a digital image, as required by claim 32. An argument analogous to the one above with respect to claim 19 applies here as well. Hence, for at least the reasons

given above with respect to claim 19, Applicant respectfully requests that that the Patent Office withdraw the rejection above of claim 32.

The Patent Office rejects claims 26-27 and 39-40 under 39 U.S.C. § 103(a) as being unpatentable over Kapatoes as applied to claims 25 and 38 above, and further in view of Frohlich.

Applicant submits that claims 26-27 and 39-40 being dependent upon allowable base claims, are patentable for at least the reasons described above with respect to their base claims. Thus, Applicant respectfully requests the Patent Office withdraw the rejection above.

The Patent Office rejects claim 52 under 35 U.S.C. §103(a) as being unpatentable over Bailey in view of Jaffray.

Applicant respectfully disagrees with the rejection above and submits that independent claim 52, as amended, is patentable over the cited references because the references do not teach or suggest performing brachytherapy comprising producing a treatment plan for placement of a radiation source while the patient is on the patient support, as required by amended claim 52.

As noted above, with respect to claim 1, Bailey teaches adjusting a position of a patient and/or a radiotherapy beam according to a treatment plan. Specifically, Bailey teaches that images are obtained to produce a plan, the images are then used to plan treatment, and "when treatment is to be provided the patient 62 is provided on table 60..." (see paragraphs 47 and 48).

Jaffray teaches implanting radio-opaque markers on a lesion (see paragraph 11).

However, the Patent Office has not identified and applicants are unable to find any teaching or suggestion in Murphy or Jaffray of performing brachytherapy comprising producing a treatment plan for placement of a radiation source while the patient is on the patient support, as required by claim 52. As known in the industry, brachytherapy includes a temporary radiation implant, or a permanent implant of a radioactive seed. On the other hand, Jaffray describes radio-opaque markers, but not implanted radiation sources, or producing a treatment plan for placement of a radiation source while the patient is on the patient support. Hence, since neither Bailey, Jaffray,

nor the combination, teaches or suggests the above noted limitation of claim 52, Applicant respectfully requests that the Patent Office withdraw the rejection above.

The Patent Office rejects claims 58 and 59 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,535,574 to Collins et al. (Collins), in view of Toshiba "Clinical Performance: Delivering upon the Promise of Multi-slice CT through Proven Performance".

Applicant disagrees with the rejection above and submits that independent claim 58, as amended, is patentable over the cited references because Toshiba does not teach or suggest a gantry that "comprises a single cast frame, wherein the frame comprises a first elongate portion and a second elongate portion disposed at an angle to one another," as required by amended claim 58.

Collins describes a patient positioning system employing surface photogrammetry and portal imaging (see Title) including gantry 210 (see Fig. 1, column 3 lines 41-56). However, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Collins that gantry 210 is a single cast frame gantry having two portions at an angle, as required by claim 58.

Toshiba teaches an aluminum, rigid, die-cast gantry (page 3, col. 1, lines 28-31).

However, the Patent Office has not identified and Applicant is unable to find any teaching or suggestion in Toshiba of a single cast frame gantry having two elongate portions disposed at an angle to one another, as required by claim 58. Hence, for at least this reason, Applicant respectfully requests that the Patent Office withdraw the rejection above of claim 58.

Any dependent claims not mentioned above are submitted as not being anticipated or obvious, for at least the same reasons given above in support of their base claims.

**CONCLUSION**

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance, and such action is earnestly solicited at the earliest possible date.

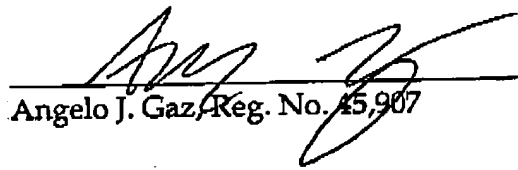
If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17.

If a telephone interview would expedite the prosecution of this Application, the Examiner is invited to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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I hereby certify that this correspondence is being transmitted via facsimile on the date shown below to the United States Patent and Trademark Office.

  
Suzanne Johnston

4/24/06  
Date